

Electrical Consistency Team

October 10, 2018

Committed To: QUALITY INSPECTIONS AND EXCELLENT CUSTOMER SERVICE

Our Goal is: FOR ALL STAKEHOLDERS TO HAVE A SUCCESSFUL PROJECT with us and that together we keep people and structures safe and buildings economically viable to serve the needs of our community.

- Customer Service Highlight:
- Contractor Continuing Education
- Electrical Consistency Questions
- Under the 2017 code, will tamper-resistant receptacles now be required for the passenger waiting/holding areas of airport?
A- No. Numbers 5,6 and 7 of article 406.12 was deleted by the NC amendments to the 2017 NEC
- Is a disconnect means required for class 2 or 3 transformers such as used for doorbells, HVAC controls etc.?
A- No. The disconnecting means of Article 450.14 applies to “other than Class 2 or Class 3 transformers”
- I have some enclosures that are installed outdoors that contain receptacles. These enclosures are raintight. Is GFCI protection for the receptacles still required?
- Yes, it would be unless either Exception 1 or 2 of 210.8(B)(4) was applicable. NC Amendment to 210.8(A)(3) and (B)(4) exempts receptacles for sewage lift pumps id dedicated spaces.
- Are disconnects required for LED fixtures that have double ended lamps?
- No,

Part XII. Special Provisions for Electric-Discharge Lighting Systems of 1000 Volts or Less

410.130 General.

(G) Disconnecting Means.

(1) General. In indoor locations other than dwellings and associated

accessory structures, fluorescent luminaires that utilize double-ended lamps and contain ballast(s) that can be serviced in place shall have a disconnecting means either internal or external to each luminaire. For existing installed luminaires without disconnecting means, at the time a ballast is replaced, a disconnecting means shall be installed. The line side terminals of the disconnecting means shall be guarded.

- Do the clearance requirements of 110.26 apply to Fire alarm panels?
- The NEC section 110.26 does not have a minimum voltage for the covered equipment. The FA panel is required to be serviced, maintained and repaired during the usable lifetime therefore warrants the workspace indicated in the section. 760.41, and 760.124 indicate the power supply for FA circuits must be installed according to the Chapters 1-4 of the NEC.
- Can TC cable be used in multi-family dwelling without being in a raceway or cable tray like you can in one and two-family dwellings?
- No. And only Type TC-ER cable containing both power and control conductors that are identified for pulling through structural members (marked “JP”) are permitted in one and two-family dwelling units per 336.10(9)

- Is it permissible to install multiple 400a service main disconnects (ie) 1 Inside and 1 outside a building?
A. Perhaps. Typically, a building is allowed only one service, (ha ha, that was meant to be funny) or better to say that each building is required to qualify for each additional service. It only fits into the B (2) group and as allowed by Special Permission is “all in or all out” Per longstanding MCCE policy and upheld by DOI

(A) Special Conditions. Additional services shall be permitted to supply the following:

- (1) Fire pumps
- (2) Emergency systems
- (3) Legally required standby systems
- (4) Optional standby systems
- (5) Parallel power production systems
- (6) Systems designed for connection to multiple sources of supply for the purpose of enhanced reliability

(B) Special Occupancies. By special permission, additional services shall be permitted for either of the following:

- (1) Multiple-occupancy buildings where there is no available space for service equipment accessible to all occupants
- (2) A single building or other structure sufficiently large to make two or more services necessary

(C) Capacity Requirements. Additional services shall be permitted under any of the following:

- (1) Where the capacity requirements are in excess of 2000 amperes at a supply voltage of 1000 voltage or less
- (2) Where the load requirements of a single-phase installation are greater than the serving agency normally supplies

through one service

(3) By special permission

(D) Different Characteristics. Additional services shall be permitted for different voltages, frequencies, or phases, or for different uses, such as for different rate schedules.

- Discuss 210.71 regarding calculation and application for commercial projects
- On the RQs for the pool pump motor change-outs, how are we to do these inspections, when there is no bond wire to the motor and we cannot locate it in the equipment room? I have gone to the ladder and hooked up to the cup holder on two pools. I did not get a continuity reading between the lights, rails, ladders or the handicap lift, either existing or added. On a third pool, only one ladder cup got a reading on two lights in pool. But the other cup holder for the ladder, which had a piece of metal to keep the spacing correct for the ladder to fit into its cups, I did not get a continuity reading between them, because of the corrosion build up. If the bond wire was to the motor and if the required GFCI checked out, then I went no further and in no case did I check any deck boxes. In the 2017 NC Amendments, GFCI is required when the 120V/208V/240V single phase pump motor is replaced but was not required in the 2014 code or the Amendments. Three phase motors do not require GFCI protection, per 680.21(C).

A-The absence of a bond wire from the pump motor to any metal parts in or around the pool, would be considered a code violation. If the contractor only replaced the pump motor, we can pass the request, as long as the pump installation is code compliant, which includes bonding the motor back to the pool bonding system. Keep in mind that article 680.21(3) (B) allows for the installation of a double insulated motor, that does not require bonding to the metal parts in or around the pool. If you are able to get continuity between the connection of the bond wire at the motor and any metal parts in or around the pool, then the bonding of the motor is compliant. However, during your continuity check, if you discover other metal parts that are not bonded that should be, the RQ cannot be passed. Notes should be added, that a permit for the pump change-out was obtained and the inspection passed, however the bonding is non-compliant, due to possible erosion or damage to the existing bond wire. The contractor that replaced the pump, can amend their permit to add repairing the bond wire, or the owner will need to obtain

another permit to make the necessary repairs and an NOV will be issued. (Discussion)

- Are we requiring a cu water pipe grounding electrode within 5' of emerging from the earth (cu from meter emerging from earth in crawl) or just bonding because plastic is now from the meter and then feeds cu water pipes in the rest of house, on these service change-outs for UPA? Do we require two ground rods and an intersystem bond, even though it was not required under the code when the dwellings were built?

UPA service changes in most cases have actually been service up grades, usually going to a 200-amp service. Because of this, the service change-outs cannot be considered like-for-like installations. In these situations, the services must be compliant with the code that is effective on the date of the permit. Keep in mind that we are dealing with the service and not any feeders or branch circuits. For instance, we do not require arc fault breakers to be installed on branch circuits that did not contain arc fault protection with the existing service. That being said, grounding the service to the water pipe, is still required. We would only accept bonding of the copper water pipe system, if the inspector has visual verification that the connection of the water pipe system to the meter, is made with plastic pipe. Without verification we will consider the metal pipe coming out of the ground, to be a grounding electrode and must be connected to the system, along with the two required ground rods. Regarding the intersystem bond, all requirements of 250.94 must be met, including the exception for existing buildings, which still requires one of the approved methods of intersystem bonding, as mentioned in the exception

- When an RQ is issued to the electrical inspector, should he contact the building inspector to have him meet him on the job?

An RQ is a request for investigation. It is an opportunity for an inspector to determine, due to existing conditions, whether or not

permits are required. If permits are required then the inspector can issue an NOV or a SWO, as he or she sees fit. The inspector should also determine, from the evidence, whether or not to involve other trade inspectors. If it is determined that other trades maybe involved, then the inspector would first discuss it with the individual inspectors (a site visit maybe necessary if so, the supervisor should be alerted) and relay the information to the owner, as well as note it on the RQ request. Only one RQ request needs to be created, not one for each trade involved. The RQ is basically designed to inform the owner that proper permits must be obtained.

- On a commercial job, can an electrical inspector pass a TC request, without temporary power on the system?
- Yes, however depending on the particular job, the building inspector and the Fire Marshal, may not be able to pass the TC, due to the requirements for illumination of exits and emergency lighting. Therefore, it is recommended that the contractor obtain TP before TC or FI.

- I have a question regarding the 2017 NEC article 680.21(C).

If we have a phase converting piece of equipment, such as a capacitor bank, roto phase, or variable frequency drive, with single phase on the line side of these pieces of equipment, and three-phase on the load side of them, and are supplying three phase-power to the swimming pool pump, does the circuit still require GFCI protection? It is my understanding that all single-phase swimming pool pumps are required to be GFCI protected and not three phase pool pumps.

Your answer and explanation is much appreciated

Per Joseph Starling of DOI,

You are correct that GFCI protection is not mandated by the electrical code for three-phase branch circuits supplying pool pump motors, specifically section 680.21(C) of the 2017 NEC.

In North Carolina, section 680.21(C) of the 2017 NEC has been amended to extend GFCI protection when pool pump motors or their branch circuits are replaced or modified by any means; however, the amendment also only applies to pool pump motors connected to single-phase, 120 volt through 240 volt branch circuits. Because the phase converter is on the line side of

the final overcurrent device that protects the pool motor, the single-phase part of the circuit cannot be part of, or defined as, the pool pump motor's branch circuit.

- I have recently been failed on several projects for "Having too many cables installed in one bored hole" Where is this located in the NEC, and what is the request to provide conductor derating information about?
- Please provide explanation regarding requirements for residential CO detectors. Multiple times recently I have failed electrical finals because of not installing a CO detector on each floor of a residence, where all the sleeping areas were on one floor?
- Is it required to have a grounded conductor connection in a PV system AC disconnect connected to the service conductors, ahead of the main? If so, I am not producing a ground, and have not created a neutral, why is this required?
- I have a nail Salon and the Engineer has called for an equipotential bond around the pedicure chairs, classifying them as hydro-massage units. If the Manufacturer's instructions do not specify that an equipotential bond is required, do I have to install one?
- It is not a requirement of the NEC for this type of equipment, If it is a manufacturer's requirement we will require it per NEC 110.3(B). The engineer can submit a bulletin to remove it, otherwise we would seek to meet the approved submitted drawings.
- Do pole bases have to be inspected? The Consistency Meeting from September 2015 says "Yes", but the September 2017 Consistency meeting removes the requirement for ground rods in pole bases, based on DOI interpretation. If the conduit runs between the pole base locations are inspected, what remains to check in the base itself?
- Does a testing room intended to administer paper test only require compliance with NEC 210.71? If no, how do we document this?
- On a building renovation in which a new service is installed due to load increase and an existing 700/701 generator, do I have to comply with NEC 700.3(701.3)?

- I was told by an inspector that I had to GFCI protect my dishwasher and disposal. I thought NC had an amendment that deleted this code section, am I wrong? –

No, you are not wrong, the NC Amendments for the 2017 NEC did delete section 210.8(D).
AMENDMENT 210.8(D)

- How far from a pool is an electric pool heater required to be?